

# CONTROL OF RADIATION EXPOSURE DURING PREGNANCY

This policy:

1. Specifies the allowable radiation dose to a developing human individual.
2. Discusses the voluntary nature of the formal declaration of pregnancy, work restrictions.

Comments and questions regarding this policy should be directed to the contact person listed below:

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## Sign-off Record:

Approved: _____	Date: _____
ESH&A Office Health Physicist	

Approved: _____	Date: _____
Manager, Environment, Safety, Health & Assurance Office	

Approved: _____	Date: _____
Laboratory Deputy Director	

## 1.0 Revision/Review Log

This document will be reviewed every three years as a minimum.

Revision Number	Effective Date	Contact Pages Person	Description of Affected Revision
0	11/22/99	Hokel	All Initial Issue
1	01/10/00	Hokel	All Review

<b>Ames Laboratory</b>	<b>Policy:</b>	10202.007
<b>Office:</b> Environment, Safety, Health & Assurance	<b>Revision:</b>	1
<b>Title:</b> Control of Radiation Exposure During Pregnancy	<b>Effective Date:</b>	01/10/00
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## 2.0 Purpose and Scope

The purpose of this policy is to implement the regulatory requirements of 10 CFR 835 and provide explanations and examples of the basic requirements for control of radiation dose to the developing human individual as a result of the occupational radiation exposure of the declared pregnant worker.

This policy is applicable to all Ames Laboratory activities that are subject to the requirements of 10 CFR 835.

## 3.0 Definitions and Comments

*Developing human individual:* a human being that is growing inside the womb of its mother, which includes the two stages of development or periods of time referred to as embryonic and fetal. Embryo or embryonic stage is defined as a period of time in the life of an unborn or developing human from the moment of conception until the end of the eighth week after conception. Fetus or fetal stage is defined as a period of time in the life of an unborn or developing human individual from three months after conception until birth. For purposes of clarity and comprehensiveness, “developing human individual” is used in lieu of the term “embryo/fetus” in this policy.

*Gestation period:* The time from conception to birth; usually 40 weeks or approximately 9 months

DOE has codified in 10 CFR 835.206 radiation dose limits for the developing human individual as a result of the occupational exposure of a declared pregnant worker. These requirements are established to provide protection to the developing human individual in a manner that does not discriminate against the rights of the pregnant worker.

Programs established to evaluate and control radiation dose to the developing human individual need to balance protection of the developing human individual (from hazards that may arise from the mother's occupational radiation exposure) against the possibility of work discrimination against the mother. The choice of providing additional protection to the developing human individual is left entirely to the voluntary discretion of the mother. The Supreme Court ruled in *United Automobile Workers v. Johnson Controls, Inc.*, 499 U.S.187, 206 (USLW 1991) that "... decisions about the welfare of future children must be left to the parents who conceive, bear, support, and raise them rather than to the employers who hire those parents."

## 4.0 Policy

### 4.1 Program Elements

#### 4.1 Declaration of Pregnancy/Withdrawal of Declaration

Due to the higher sensitivity of the developing human individual to ionizing radiation (relative to the sensitivity of adults), 10 CFR 835 establishes provisions for individuals to voluntarily declare their pregnancy in writing and to accept restrictions on the dose equivalent to the developing human individual, [i.e., 0.5 rem (0.005 Sv)].

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It remains the sole and fundamental responsibility of the employee to decide whether to formally declare her pregnancy and consequently become subject to the above dose limits and restrictions. It is Ames Laboratory's responsibility to ensure that the employee is fully informed and provided with counseling to assist in her decision making. Deciding whether or not to accept the risk from radiation dose to the developing human individual is entirely the responsibility of the pregnant employee.

A pregnancy may be declared by a pregnant employee or by an employee who is planning a pregnancy, and shall be formally declared in writing. The declaration shall include the estimated date of conception, and should be declared as early in the pregnancy as possible. A declared pregnant worker that is planning a pregnancy should notify her supervisor as soon as possible following verification of conception. The statement should be signed by the employee and delivered to her supervisor and the ESH&A Office Health Physics Group. A sample Ames Laboratory declaration form is provided in Appendix A of this policy.

10 CFR 835 also allows an individual who has declared her pregnancy to withdraw her declaration and to return to the general employee occupational dose limit of 5 rem total effective dose equivalent in a year. Ames Laboratory is considered to be notified of the withdrawal of the declaration of pregnancy at the time that the individual submits a signed and dated statement to her supervisor or to the ESH&A Office Health Physics Group, indicating that she is withdrawing her formal declaration of pregnancy. A sample form is provided in Appendix B of this policy.

The Laboratory should request no additional explanation or justification from the worker. The worker shall be allowed to withdraw her declaration of pregnancy at any time, thus terminating any work restrictions. Once such notification has been made, it is the Laboratory's responsibility to remove any imposed work or area restrictions.

The rights (e.g., right to work) and privacy of the worker shall be maintained before, during, and following any declaration of pregnancy. All aspects of the worker's withdrawal of the declaration of pregnancy should also be maintained confidential. The rights and privacy of workers who have chosen not to declare their pregnancy should also be respected. 10 CFR 835.901 requires that radiation safety training include discussions of the risks of exposure to radiation and radioactive materials during pregnancy, and include an individual's rights and responsibilities as related to Ames Laboratory's radiation protection program. Therefore, there is no need to remind an undeclared pregnant worker of the opportunity for a pregnant employee to avail herself of the special limits for protection of the developing human individual; however, she must still be made aware of normal occupational dosimetry requirements.

#### **4.2.2 Work Restrictions Following Declarations of Pregnancy**

A full description of work restrictions of an employee following declaration of pregnancy is described in the most current revision to Ames Laboratory procedure, "Occupational Exposure Assessment."

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### 4.2.3 Counseling

An Ames Laboratory employee with expertise in health physics, laboratory safety, occupational health, or medical services will be designated as a contact for female workers to obtain counseling or additional information on the subject of the risks to the developing human individual from exposure to ionizing radiation. Individuals who provide this counseling should receive training in risk communication and be knowledgeable of the risks of the developing human individual's radiation exposure.

Counseling of any worker on the risks of exposure to radiation to the developing human individual shall be documented regardless of the worker's decision to declare or not to declare the pregnancy.

### 4.2.4 Dose limits

Ames Laboratory does not perform monitoring for the embryo/fetus, unless specifically requested by the declared pregnant worker. Based on the nature of the radiation fields and radioactive material present, an internal uptake by a declared pregnant worker is unlikely. In the instances when embryo/fetal monitoring is not performed, the dose equivalent assigned to the embryo/fetus is conservatively taken to be that assigned to the declared pregnant worker.

The dose equivalent limit for the developing human individual from the period of conception to birth, as a result of occupational exposure of a declared pregnant worker, shall be 0.5 rem. Efforts shall be made to avoid exceeding 50 millirem per month to the declared pregnant radiological worker.

If the dose equivalent to the developing human individual is determined to have already exceeded 0.5 rem (0.005 sievert) by the time a worker declares her pregnancy, the declared pregnant worker shall not be assigned to tasks where additional occupational exposure is likely during the remaining gestation period.

## 4.3 Training

All individuals who enter a controlled area shall fully understand the risk to the developing human individual from ionizing radiation received as a result of a mother's occupational exposure. Workers and supervisors must thoroughly understand policies regarding exposure to developing human individuals.

[Note that the radiation safety training requirements in 10 CFR 835.901, which include the risk of prenatal exposure to ionizing radiation, pertain to workers who are allowed unescorted access to, and/or receive occupational radiation dose in, controlled areas. Under certain conditions, it is possible that a pregnant worker outside of the controlled area could receive a dose exceeding the 0.05 rem monitoring threshold, but not be subject to the 10 CFR 835.901 training requirements. If such conditions exist, measures should be implemented to ensure that affected workers are aware of the risks of the developing human individual's radiation exposure and their rights to declare their pregnancy. This information should be included in radiation safety training or equivalent measures.]

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#### **4.4 Records of Developing Human Individual Dose and Declared Pregnant Workers**

Records pertaining to the developing human individual and the declared pregnant worker shall include:

- the dose equivalent to the developing human individual of a declared pregnant worker;
- the written declarations of pregnancy for the individual, including estimated conception date; and
- the written revocations of declarations of pregnancy for the individual, if any.

Other records that should be maintained include:

- any work restrictions imposed;
- any counseling performed;
- monitoring performed (e.g., dosimeter placement, bioassay frequency, supporting workplace monitoring); and
- records of reports provided.

## **5.0 REFERENCES**

DOE 1998. Occupational Radiation Protection. 10 CFR 835. 63 FR 59662. Federal Register Vol. 63, No. 213, dated 11-4-98. Washington, D.C.

DOE 1999a. DOE G 441.1-12. RADIATION SAFETY TRAINING GUIDE, Dated 3-17-99. Washington, D.C.

NRC (U.S. Nuclear Regulatory Commission) 1987. Instruction Concerning Prenatal Radiation Exposure. Regulatory Guide 8.13. Washington, D.C.

NRC 1992. Radiation Dose to the Developing human individual. Regulatory Guide 8.36. Washington, D.C.

Sikov et al. 1992. Sikov, M. R., R. J. Traub, T. E. Hui, H. K. Meznarich, and K. D. Thrall. 1992. Contribution of Maternal Radionuclide Burdens to Prenatal Radiation Doses. NUREG/CR-5631, Rev. 1. Washington, D.C.

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## Appendix A

### DECLARATION OF PREGNANCY FORM

#### AMES LABORATORY

#### Office of Environment, Safety, Health & Assurance

#### DECLARATION OF PREGNANCY

Name of Individual \_\_\_\_\_  
 Social Security Number \_\_\_\_\_  
 Date of Conception (Mo./Yr.) \_\_\_\_\_

By providing this information to my immediate supervisor, in writing, I am declaring myself to be pregnant as of the date shown above. Under the provisions of 10 CFR 835.206, I understand that my dose will not be allowed to exceed 500 mrem (5 mSv) during my entire pregnancy from occupational exposure to radiation. I understand this limit includes exposure I have already received. When the pregnancy has ended, I will inform my supervisor and the Environment, Safety, Health & Assurance Office as soon as practical. I also understand I have the right to revoke this declaration of pregnancy at any time and such revocation must be made in writing to the Environment, Safety, Health & Assurance Office.

Signature of Individual \_\_\_\_\_  
 Date signed \_\_\_\_\_

#### RECEIPT OF DECLARATION OF PREGNANCY

Name of Supervisor \_\_\_\_\_

I have received notification from the above-named individual that she is pregnant. I have explained to her the potential risks from exposure to radiation as in Regulatory Guide 8.13, Revision 3. I have evaluated her prior radiation dose and established appropriate limits to control the dose to the developing unborn child in accordance with the limits in 10 CFR 835.206. I have explained to her options for reducing her exposure to As Low As Reasonably Achievable (ALARA) levels.

Signature of Supervisor \_\_\_\_\_  
 Date Signed \_\_\_\_\_

Send this completed form to the Health Physics Group, Environment, Safety, Health and Assurance Office, G40A, TASF. The information furnished on this form will be used and maintained pursuant to 5 U.S.C. 552a(e)(3), enacted into law by Section 3 of the Privacy Act of 1974 (Public Law 93-579).

## Appendix B

### WITHDRAWAL OF PREGNANCY DECLARATION FORM

#### AMES LABORATORY Office of Environment, Safety, Health & Assurance WITHDRAWAL OF PREGNANCY DECLARATION

I am withdrawing my previous declaration of pregnancy. I understand that, as a result of signing and submitting this form, any work restrictions that have been imposed as a result of the previously submitted "Declaration of Pregnancy" will be lifted.

Date of Pregnancy Declaration: \_\_\_\_\_

_____ Signature of Worker	_____ ID # (Social Security Number)
_____ Printed Name of Supervisor	_____ Title
_____ Signature of Supervisor	_____ Date
_____ Printed Name of Health Physics Or Medical Representative	_____ Title
_____ Signature of Health Physics or Medical Representative	_____ Date

Send this completed form to the Health Physics Group, Environment, Safety, Health and Assurance Office, G40A, TASF. The information furnished on this form will be used and maintained pursuant to 5 U.S.C. 552a(e)(3), enacted into law by Section 3 of the Privacy Act of 1974 (Public Law 93-579).

## Appendix C

### THE DEVELOPING HUMAN INDIVIDUAL'S DOSE EQUIVALENT RECORD

#### AMES LABORATORY Office of Environment, Safety, Health & Assurance

#### THE DEVELOPING HUMAN INDIVIDUAL'S DOSE EQUIVALENT RECORD

Date of Pregnancy Declaration: _____		
Estimated Date of Conception: _____		
Estimated External Dose (prior to Declaration of Pregnancy):	_____	
External Dose for remaining period of pregnancy:	_____	
Estimated Internal Dose (prior to Declaration of Pregnancy):		
From radionuclides in the embryo/fetus:	_____	
From radionuclides in the mother:	_____	
Subtotal:	_____	
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Internal Dose for remaining period of pregnancy:		
From radionuclides in the embryo/fetus:	_____	
From radionuclides in the mother:	_____	
Subtotal:	_____	
Total Effective Dose Equivalent during gestation period: _____		